In response to discussions with USEPA and to include additional work performed after the RFI was issued, IT Corporation (IT) has made redline/strikeout changes to the Final RFI for review and comment. The correct page numbers will be added once the changes have been approved and the redline/strike-out has been removed. Changes are proposed to the following sections of the RFI:

General Items

Reference value for lead exposure in industrial soils was changed to 400 ppm from 800 ppm as suggested by USEPA. This modification was performed throughout the report but did not change any of the exceedance values because none of the lead results were between 400 and 800 ppm. Tables only requiring this change are not provided in this revision package.

Executive Summary

Updated with presumptive remedy for SWMU Group A.

Updated to include discussion on SWMUs included in the institutional control plan.

Page 3-7, Paragraph 2, last sentence

Reworded as suggested by USEPA, added 'and to determine if that indicates a data gap.

Section 3.2.2
Added statement indicating that drinking water MCLs were used to derive SSLs and that Region III drinking water RBCs were used for constituents which do not have MCLs.

Added discussion of detection limit evaluation, analysis provided in Appendix F.

Table 3.2-9
Added missing cancer potency slope factor for 2,4-TDA using the same value for inhalation and ingestion as suggested by USEPA.

Background

Section 4.1 Background

Added Table 4.1-2	Presents mean and median for detected background metals data.
Page 4.1-1	Added text presenting Table 4.1-2

SWMU Group A

Page 4.2-2	Modified text to indicate isolated nature of chloroform detection.
Section 4.2.3	Updated discussions with USEPA

SWMU Group B

Table numbering was corrected in text

Table 4.3-1	Sample Depth for SM005-TB14-0001 has been corrected to read 0.00-1.00
Tables 4.3-5 and 4.3-6	Shading has been removed to make more legible

Table 4.3-9	Table (Risk Summary) has been included, excluded during reproduction of report.
Section 4.3.3.4	Reworded section as indicated by USEPA.
Section 4.3.4	Discussions with USEPA have been updated
Figure 4.3-2	Figure Showing Surface Conditions has been added.

SWMU Group C

Shading has been removed from Tables to make more legible.

Section 4.4.4	Discussions with USEPA have been updated.
Figure 4.4-2	Added figure showing surface conditions in the SWMU C area

SWMU GROUP D

Section 4.5.4	Discussions with USEPA have been updated
Section 4.5.5	Statement added to indicate that SWMU Group will be included in soil management plan.

SWMU 21

Figure 4.12-1	Corrected analytical boxes to indicate correct sample location.
Section 4.12.2	Removed next to last sentence in first paragraph, incorrect statement.
Section 4.12.3.1	Corrected industrial to residential at the end of first sentence.

SWMU 27

Section 4.18.4	Updated discussions with USEPA.

SWMU 30

Section 4.21.4	Updated discussions with USEPA.
Section 4.21.5	Updated conclusions/recommendation to address items discussed with USEPA.
Section 8	Updated based on report modifications.
Appendix F	Added discussion of detection limit evaluation performed based on teleconference calls with USEPA.

Executive Summary

Updated with presumptive remedy for SWMU Group A.

Updated to include discussion on SWMUs included in the institutional control plan.

Executive Summary

Bayer Corporation (Bayer) has conducted a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at their New Martinsville, West Virginia facility. The RFI was completed in accordance with the requirements in the facility's RCRA permit for Corrective Action and Waste Minimization (WVD 05 686 6312). The facility is located on State Route 2, approximately 5 miles north of New Martinsville, West Virginia. Three production divisions operate at the facility, the plastics division, the polyurathane division, and the coatings and colorants division. The facility previously operated under the names of Mobay Corporation (1954-1992), and Miles, Inc. (1992-1995). Bayer has formally applied for industrial land use for the property.

A total of 30 solid waste management units (SWMUs) were investigated as part of the RFI. Surface water and sediments were also evaluated as part of the RFI. A screening level risk assessment on existing groundwater data was performed to evaluate on-site and off-site water quality. The overall objectives of the RFI included the following:

- Characterize the soils in the vicinity of each SWMU,
- Define the nature and extent of constituents in soils which may pose a human health and/or ecological risk,
- Assess risks to human health and the environment based on chemical data from each SWMU,
- Identify SWMUs which require a corrective measures study (CMS), based on identified risks.

The approved RFI Work Plan (ICF Kaiser, 1996) outlines a three-phased investigation that utilizes a risk assessment approach to determine if each SWMU warrants further investigation, risk evaluation, or corrective measures. The three phases are comprised of the following eight ~~T~~tasks:

Phase Number	RFI Task Number	Task Name
1(a1)	1	Historic Aerial Photo/Drawing Review & Site Survey
	2	Geophysical Surveys
	3	Soil Gas Survey
	4	Groundwater Investigation
2(b2)	5	Confirmatory Test Borings and Soil Sampling
	6	Concrete Sampling
	7	Lagoon Water and Sediment Sampling
3(c3)	8	Surface and Subsurface Soil Sampling

(a1) Site reconnaissance and groundwater evaluation.

(b2) Confirmatory sampling/initial assessment of nature and extent.

(c3) Nature and extent investigation.

Phase 1

Phase 1 of the RFI, the Site Reconnaissance and Groundwater Evaluation, was comprised of a historical document/photograph review, a soil gas survey, and geophysical investigations performed as screening tools to properly focus the Phase 2 investigation. The results of Phase 1 were provided to United States Environmental Protection Agency (USEPA) in the Phase 1 Technical Memorandum (ICF Kaiser, 1997). An ecological survey was also performed to identify potential habitat and species of flora and fauna present. The survey indicated that most of the site is industrial, containing buildings and/or pavement and does not serve as habitat. The southern portion of the plant including SWMUs 1, 2, 3, and 4 contain minimal habitat for transient species of birds. Based on the lack of habitat and the industrial nature of the site, ecological risks were not evaluated further.

Phase 2

Phase 2 of the RFI, the Confirmatory Sampling/Initial Assessment of Nature and Extent, used results of Phase 1 as an aid in refining soil sampling locations. In Phase 2, 482 soil samples were collected from 135 test borings installed throughout the 30 SWMUs. Phase 2 soil samples were biased primarily towards areas where (1) a potential release from each SWMU would be most likely to occur based on the configuration, historical activities, and observations of surface staining (if any), and (2) the Phase 1 results indicated the highest potential for contamination. The Phase 2 Technical Memorandum (ICF Kaiser, 1998), presented the findings of Phase 2 of the RFI and incorporates, where applicable, results from previous work to draw conclusions

relative to soil conditions at the individual SWMUs. The Phase 2 results were discussed with USEPA and comments were incorporated into the Phase 3.

A risk driven approach is being applied to facilitate implementation of the RFI. The primary purpose of the risk assessment for the New Martinsville facility is to assist in the process of deciding the appropriate action to take at each SWMU. The goal of Phase 2 has been to identify potential source areas using samples located in the areas of highest potential concentration. The screening-level risk assessment was designed to use appropriate, conservative, risk assessment methodologies and assumptions to identify which SWMUs warranted further evaluation in Phase 3.

The screening-level risk assessment approach used in Phase 3 consisted of a three-tiered approach in which maximum detected concentrations and detection limits from the Phase 2 analytical results are compared against conservative screening criteria. The specific tiers of evaluation used in the Phase 2 screening-level risk assessment are:

- First Tier: Screening Against USEPA Region III Risk Based Criteria (RBCs) and USEPA Default Soil Screening Levels (SSLs).
- Second Tier: Screening Values Exceeding USEPA Default SSLs against Site-Specific SSLs
- Third Tier: Detailed Data Analysis for Areas with Values exceeding RBCs and/or Site-Specific SSLs

SWMUs that contained constituents exceeding the RBCs or site specific SSLs were identified and recommended for further analysis during the Phase 3 investigation.

Phase 2 Conclusions

Based on the three tiered evaluation screening-level risk assessment of Phase 2 data, recommendations for categorizing SWMUs as requiring No Further Action (NFA) or for further evaluation in Phase 3 have been developed. These recommendations were discussed with USEPA after submittal of the Phase 2 Technical Memorandum. USEPA concurred that 14 of the 30 SWMUs and the surface water/sediments of Beaver Run are appropriately placed in the NFA category. The remaining 16 SWMUs were grouped based on proximity, usage, and similar analytical results. The results of the Phase 2 risk screening are presented in Table ES-1, along with the tier at which the decision was made.

Phase 3

SWMUs requiring further analysis based on the Phase 2 evaluation were grouped as follows:

SWMU GROUP	SWMU
A	1, 2, 3, and 4
B	5 and 6
C	7, 8, 9, and 11
D	10, 12, 15, and 16
•	21
•	27
•	30

An additional 74 soil samples were collected from 30 borings during the Phase 3 evaluation. These soil samples were targeted to fill in data gaps identified based on the Phase 2 results. Human health risks for each of the SWMU groups were evaluated using the all the RFI analytical data for the SWMUs Groups evaluated. The risk assessment followed the same tiered approach described in Phase 2. However, if constituents of interests exceeded the screening values, a site-specific risk assessment was performed during Phase 3. The site-specific risk assessment evaluated potential exposure to industrial workers and construction workers. The facility received USEPA approval of an industrial land use designation in a letter dated August 29, 2000. Because the Bayer facility is an industrial facility with controlled access, industrial workers and construction workers are the only likely individuals to be exposed to site soils. The industrial worker and construction worker scenarios evaluated soils to depths of 2 and 5 feet, respectively. The results of the risk assessment indicated that the exposure risks for each of the SWMU Groups are within an acceptable range as defined by USEPA. No further action was recommended for SWMU Groups A through D, and SWMUs 21, 27, and 30 based on the results of the exposure risk assessment. However, SWMU Groups A through D and SWMU30 will be included in an institutional control plan covering subsurface work. A soil management plan for SWM30 will be included in the institutional control plan.

Comparison of maximum detected concentrations to site-specific SSLs indicated that several of the constituents at each of the SWMU groups have a potential to leach to groundwater at potentially unacceptable concentrations. However, groundwater levels and constituents concentrations from groundwater monitoring data collected since 1985 have consistently indicated that groundwater beneath the site is hydraulically controlled by on-site pumping.

Groundwater Evaluation

A screening level risk assessment was performed using 1998 quarterly groundwater monitoring data. This screening assessment compared detected constituents to the federal maximum contaminant levels (MCLs) for drinking water or the USEPA Region III tap water risk based criteria if an MCL was not available for a given constituent. This screening showed that 22 constituents in on-site groundwater exceeded their respective MCL or RBC. Eighteen of the constituents exceeding their respective criteria are organic compounds. The samples from off-site wells did not exceed the MCLs or RBCs for any constituent.

Bayer has been pumping from three on-site recovery wells since 1986. Groundwater monitoring has consistently shown an inward hydraulic gradient towards the recovery wells throughout the area of the organic compound plume, thereby containing groundwater on-site. Additionally, monitoring of off-site wells has not detected the presence of site related constituents. Therefore, it appears that the continued pumping of the existing production wells should eliminate risk to off-site receptors. However, constituents in on-site groundwater continue to exceed established criteria after almost 15 years of pumping. Therefore, a CMS is recommended for site-wide groundwater to evaluate technologies to expedite restoration of the on-site aquifer. USEPA concurred with the recommendation for a groundwater CMS in a letter dated August 30, 2000.

In addition to the CMS for sitewide groundwater, a presumptive remedy of an engineered soil cover is recommended for SWMU Group A. This cover, which will include permeability requirements, is recommended to improve surface drainage and reduce infiltration of precipitation.

Page 3-7, Paragraph 2, last sentence

Reworded as suggested by USEPA, added 'and to determine if that indicates a data gap.

during the detailed data evaluation and are not used in the site-specific risk assessment. Second, all detected constituents were evaluated using one or more of the following: frequency of detection; extent and distribution of detected constituents (vertical extent especially for constituents with concentrations greater than SSLs); and whether exposure pathways are complete. For example, regarding frequency of detection, the maximum detection of a constituent may exceed its RBC; however, this may be the only detection out of a large number of samples. Furthermore, this detect could be located at depth or under a paved portion of the site where direct contact would not occur.

For constituents with detection limits that exceed screening criteria, the detailed data analysis also may have included an evaluation of whether these constituents are related to plant processes, have been detected at other SWMUs, or have elevated detection limits. If a detection limit was elevated, it was evaluated to assess the cause, and to determine if ~~it could be discounted.~~that indicates a data gap.

Based on the conclusions of the detailed data evaluation, SWMUs were either recommended for NFA or a site-specific human health risk assessment. Possible examples of justification for recommending NFA include low frequency (e.g., <5%) of concentrations exceeding screening criteria or exceedences of site-specific SSLs in a shallow but not a deeper sample from the same boring. SWMUs remaining after the detailed data evaluation were recommended for further risk assessment.

Human Health Risk Assessment

The initial phases of the risk assessment process identified several SWMUs where NFA was recommended. However, for the remaining SWMUs site-specific risk assessments were conducted based on SWMU Groupings, as well as individual SWMUs. The site-specific evaluations were performed during Phase 3 of the RFI.

In accordance with USEPA's Risk Assessment Guidance for Superfund (USEPA, 1989a) and supplemental risk assessment guidance (USEPA, 1992a), a human health risk assessment consists of the following steps:

- Identification of Constituents of Interest
- Exposure Assessment
- Toxicity Assessment

Section 3.2.2

Added statement indicating that drinking water MCLs were used to derive SSLs and that Region III drinking water RBCs were used for constituents which do not have MCLs.

Added discussion of detection limit evaluation, analysis provided in Appendix F.

In deriving the default SSLs, USEPA made highly conservative assumptions regarding the variables that control leaching. These assumptions are highly conservative in that they greatly overestimate potential migration from soil to groundwater. To provide a more realistic assessment of potential releases to groundwater, site-specific SSLs were developed for those SWMUs at the Bayer New Martinsville facility having one or more constituents at concentrations that exceed the USEPA default SSLs. The same partitioning equation used by USEPA was employed in this analysis, substituting site-specific values for the default parameters when available. This approach is recommended by USEPA (1996b) when such data are available. The methods used for the site-specific SSL calculations are presented in Appendix F-2. Federal drinking water MCLs were used to derive the site specific SSLs. For constituents without a MCL, the USEPA Region III drinking water RBC was used to derive the site-specific SSL. The resulting SSLs for each respective SWMU and SWMU Group are presented in Table 3.2-2.

The analytical data for SWMUs with detected constituent concentrations that exceed the default USEPA SSLs were compared to the calculated site-specific SSLs. As in the initial screen against the default USEPA SSLs, this comparison was also conservative in that it was made using the maximum soil concentration and maximum detection limit. Consequently, although this is a more accurate comparison than using USEPA default SSLs, comparing the maximum concentrations to the site-specific SSLs overestimates the source mass, and for this reason is still overly conservative. The individual comparisons are presented in Section 4. SWMUs with maximum detected concentrations or detection limits less than the site-specific SSLs (as well as the RBCs) were recommended for NFA.

3.2.3 Site-specific Risk Assessment

For SWMU constituents with maximum detected concentrations exceeding site-specific SSLs or maximum detected concentrations and/or detection limits exceeding industrial RBCs, more evaluation was necessary to determine whether further action was warranted. The first step of the site-specific assessment is a detailed data evaluation.

Detailed Data Evaluation

SWMUs not placed into the NFA category based on the comparison to risk-based criteria or site-specific SSLs were carried through a detailed data evaluation. First, several rejected or "R" qualified data were not used for individual SWMUs. These data were removed from the data set

- Risk Characterization/Uncertainty Analysis.

Identification of Constituents of Interest

The first step of the risk assessment process involves identifying those constituents that have the greatest potential for producing carcinogenic and non-carcinogenic human health effects. This step was, in effect, conducted in the screening-level risk assessment phase. However, for the site-specific risk assessment scenarios, appropriate soil data sets were evaluated depending on the likely receptor(s) at that SWMU. If an industrial worker was identified as a potential receptor, the 0- to 2- foot data set was evaluated. For a construction worker scenario, the 0- to 5- foot data set was evaluated (to account for the possibility of digging). Constituents in soil from each data set identified as being present above their respective USEPA Region III Industrial RBCs were identified as constituents of interest (COIs) for soil. However, other factors may be taken into consideration in the selection or exclusion of a constituent as a COI. These factors include environmental fate and transport properties, natural and anthropogenic background concentrations, and the likelihood that a constituent is site-related. In addition, any detected constituents of low inherent toxicity (i.e., essential nutrients) were eliminated as COIs.

Exposure Assessment

The exposure assessment identifies the applicable exposure pathways and the estimated intensity, frequency, and duration of contact between potential human receptors and the constituents of interest. It also combines exposure concentrations and intake assumptions to quantitatively estimate exposure (dose). Based on the current and future land use of the facility, industrial and construction workers were identified as the only two appropriate receptors. However, not all SWMUs may be candidates for the construction worker scenario. A phased approach was taken regarding selection of appropriate receptors for each SWMU Group. Initially, both receptors were assessed in the risk assessment, as a conservative assumption. If estimated risks and hazards were acceptable, no further refinement with regard to receptor selection was taken. However, if risks and hazards were unacceptable for the construction worker, a more detailed evaluation was performed to determine if this receptor would realistically be expected to be present at the SWMU Group. If compelling information exists to deselect the construction worker receptor, the exposure assessment was modified to take this into account.

These two receptors are assumed to be exposed to soil constituents via the following four standard pathways:

(1) incidental ingestion of soil;
(2) dermal contact with soil;
(3) inhalation of particulates released from soil; and
(4) inhalation of volatiles released from soil.

The fraction of impacted soil, or "FC" is defined as the fraction of environmental media contacted, via ingestion, dermal contact, or inhalation, at the area being evaluated. The FC is conservatively assumed to be 1.0 in most cases, but it may be based on best professional judgement using available site-specific information in a refined assessment. In most cases FC is set at 1.0, and an alternative FC is only used when estimated risks or hazards are above acceptable risk or hazard thresholds. Note: This approach was taken to streamline the risk assessment process. The two site-specific factors that are generally considered when designating an alternative FC are (1) site cover characteristics; and (2) indoor vs. outdoor exposure potential. Site cover may be gravel at some sites. This would significantly reduce the potential for soil exposure by industrial workers because gravel would not allow direct contact with soil and would significantly reduce particulate wind erosion resulting in less inhalation exposure.

The potential for an industrial worker to be outdoors (and thus exposed to soil) could also be quite low due to site-specific considerations, and workers spending most of the day indoors in an office environment would be expected to have an "FC" much less than 1.0. Most workers would only be outdoors when they walked from building to building, unless the site itself required outdoor work tasks that required the worker to be outside most of the work day.

The exposure point concentrations in soil to which an industrial worker is assumed to be exposed at each SWMU is the 95% upper confidence limit (UCL) of the constituent concentration in the 0- to 2-foot depth interval. The exposure point concentrations to which a construction worker is assumed to be exposed at each SWMU is the 95% UCL of the constituent concentration in the 0- to 5-foot depth interval (to account for a digging scenario). The 95% UCL concentrations are derived based on USEPA (1992b) guidance, and are calculated according to the distribution of the data, normal versus lognormal.

The distributions of data sets for constituents in soil were tested for normality using the Shapiro and Wilk Test (W-Test). Non-detect values are incorporated into the data set at one-half the detection limit, and data from duplicate samples are averaged and considered as one sample. The

Table 3.2-9

Added missing cancer potency slope factor for 2,4-TDA using the same value for inhalation and ingestion as suggested by USEPA.

TABLE 3.2-9

TOXICITY CRITERIA FOR CONSTITUENTS OF INTEREST IN SOIL

Constituent	Associated SWMU Group	Oral CSF [CSFo] $(mg/kg\text{-}day)^{-1}$	Inhalation CSF [CSFi] $(mg/kg\text{-}day)^{-1}$	USEPA Weight-of-Evidence Classification	Chronic Oral RfD [RfDo] (mg/kg-day)	Subchronic Oral RfD [RfDo] (mg/kg-day)	Chronic Inhalation RfD [RfDi] (mg/kg-day)	Subchronic Inhalation RfD [RfDi] (mg/kg-day)
2,4-Toluenediamine	A,B,C,D,E	3.2 (H)	3.2 (H, *)	NA	NA	NA	NA	NA
m-Toluidine **	D	0.19 (H)	NA	NA	NA	NA	NA	NA
o,p-Toluidine **	D	0.19 (H)	NA	NA	NA	NA	NA	NA
Benzene	D	0.029 (I)	0.029 (I)	A	0.003 (E)	NA	0.0017 (E)	NA
Aniline	D	0.0057 (I)	NA	B2	0.007 (E)	NA	0.00029 (I)	0.01 (H)

** Toxicity criteria of p-toluidine used.

* Used cancer slope factor for oral as recommended by USEPA

(I) IRIS (USEPA, 1999)

(E) USEPA NCEA Regional Support provisional value

(H) HEAST (USEPA, 1997)

Notes: Oral criteria used for dermal route of exposure.

When subchronic toxicity values not available, chronic toxicity criteria used.

NA = not available

Background

Section 4.1 Background

Added Table 4.1-2	Presents mean and median for detected background metals data.
Page 4.1-1	Added text presenting Table 4.1-2

4.1 AREA 1: UNDEVELOPED AREA (Background Sample Results)

RFI Area 1 has never been developed. The boundaries for Area 1 were chosen to include virtually all undeveloped Bayer property in which chemical production has not occurred, waste has not been placed, and spills have not occurred.

4.1.1 RFI Scope of Work

As part of the Phase 2 investigation, five test borings were advanced using a HSA rig into the subsurface of Area 1 to depths of 5 ft-bgs to 16 ft-bgs at the locations illustrated in Figure 4.1-1. Soil samples were collected for submittal to the analytical laboratory from each of the five borings at the 0 to 1 ft-bgs, 3 to 5 ft-bgs, and either the two-foot sample either above groundwater or refusal in order to provide information on background conditions. All soil samples collected from Area 1 were submitted to the Bayer laboratory and analyzed for SVOCs and metals. The Bayer laboratory subcontracted the VOC analysis to Lancaster Laboratories. Table 4.1-1 presents the complete soil analytical results for Area 1 and Figure 4.1-1 provides selected soil analytical results on a plan view map. Table 4.1-2 provides the means, medians, and modes of the background metals data.

4.1.2 Field Observations

Appendix D contains the boring logs for test borings BG001-TB01 through BG001-TB05. The boring log for BG01-TB001 indicates that the area to the south of the developed portion of Bayer's property is underlain by soil comprised of reddish brown silt and clay from the surface to 7 ft-bgs, then changes to yellowish brown silty sand. Three background test borings were located to the east of State Route 2. Test boring BG001-TB02 is the southernmost boring and indicates the area is underlain by yellowish brown silty clay to a depth of 4 ft-bgs then changes abruptly to a yellowish orange-brown fine to medium grained sand with sandstone fragments. The remaining two borings east of State Route 2 (BG001-TB03 and BG01-TB04) as well as the test boring north of the developed portion of Bayer's property, predominately indicate a dark brown silty clay with organic matter and sandstone rock fragments in the upper 8 to 10 feet. Underlying this, soil comprised of reddish and yellowish silts and sands with varying amounts of sandstone rock fragments is present. Screening of the soil samples with an organic vapor monitor (OVM) did not detect organic vapors above background readings (1 part per million [ppm]) in any of the soil samples collected in Area 1.

Table 4.1-2
Selected Constituent Average Concentrations in Background Soil
Bayer, New Martinsville

	Mean	Median	Mode
Chromium	4134	4000	N/A
Lead	2168	2053	N/A
Nickel	8272	7110	N/A

Note:
Antimony and cadmium were not detected above the detection limit
Units in ug/Kg

SWMU Group A

Page 4.2-2	Modified text to indicate isolated nature of chloroform detection.
Section 4.2.3	Updated discussions with USEPA

SWMU 4: ASH LAGOON

The former ash lagoon was constructed in 1973 by excavating and constructing a dike around the perimeter of the excavated area. No ash has been deposited in the lagoon since 1980. This SWMU consisted of an unlined, irregularly shaped impoundment covering approximately one acre. It is located over the former streambed of Beaver Run, adjacent to and immediately north of the south landfill (SWMU 1) and east of the sludge lagoon (SWMU 2). The depth and volume of the impoundment are not known. Ash slurry from the incineration of clarifier sludge in the multiple hearth sludge furnace was discharged to the lagoon with excess water transported back to the waste water treatment area. SWMU 4 is partially filled with impounded rainwater. On the east and south sides, an earthen berm separates the ash lagoon from Beaver Run.

4.2.1 Summary: RFI Scope of Work

4.2.1.1 Phase 1 Scope of Work

The Phase 1 scope of work at this SWMU included review of historical photographs and drawings, a soil gas survey and an electromagnetic survey. The historical review of photographs and drawings has been incorporated into the SWMU descriptions and the depictions of the SWMU boundaries.

Soil Gas Survey

A soil gas survey (RFI Phase 1, Task 3) was conducted across the entire landfill area (SWMUs 1, 2, and 3) in the fall of 1996 (ICF Kaiser, 1997). Soil gas samples were collected at 38 locations in and around the landfill at depths of 2.5 and 7.5 ft-bgs. The locations illustrated in Figures C-1 and C-2 of Appendix C. Soil gas samples were not collected in SWMU 4 due to the impracticality of collecting soil gas samples from materials with a high water content.

Total VOC concentrations in soil gas are considered to be elevated if found above 100 g/L. This is considered to be a conservative cut-off value and was derived after several years of comparing actual analytical soil chemistry results with soil gas results. The soil gas survey results were not elevated over most of SWMU Group A. However, elevated soil gas concentrations were identified ~~primarily showed elevated concentrations of VOCs at the 2.5 ft-bgs interval~~ in a small area in the southwest corner of the landfill. Other~~; however,~~ isolated areas also indicated low concentrations (generally < 50 g/L) of VOCs. ~~The main constituent detected during the soil gas survey was~~ Cehloroform (maximum concentration of 3,800 g/L), with minor amounts of chlorobenzene, benzene, hydrocarbons, and toluene, was the main constituent

detected in the small area in the southwest corner of the landfill. This small area of elevated VOCs shifted east at the 7.5 ft-bgs interval with chloroform at a maximum concentration of 1360 g/L. In general, results from the 7.5 ft-bgs interval displayed a more sporadic distribution of total VOC concentrations consisting primarily of hydrocarbons, freon 11, and freon 12. Elevated concentrations of benzene and chlorobenzene were also found along the eastern border of the landfill, between SWMUs 1 and 4.

Elevated total VOC concentrations were found at 7.5 ft-bgs in soil gas point SM002-SG003, located near the center of SWMU 2. There were no VOCs detected in the 2.5 ft-bgs interval for this point (Figure C-1 of Appendix C). The VOC concentrations at this location consist primarily of freon 12 (maximum concentration of 90 g/L) and hydrocarbons (maximum concentration of 26 g/L).

There were no elevated concentrations of total VOCs detected in 2.5 ft-bgs soil gas samples in the immediate vicinity of SWMU 3 (Figure C-1 of Appendix C). In the 7.5 ft-bgs samples immediately surrounding SWMU 3, there was only one soil gas point (SM003-SG002) with elevated total VOC concentrations (Figure C-2 of Appendix C). Results from soil gas point SM003-SG002 show chlorobenzene (maximum concentration of 700 g/L) and hydrocarbons (maximum concentration of 148 g/L) as major soil gas constituents, with relatively minor amounts of freon 12, freon 22, and benzene.

Electromagnetic Survey

An electromagnetic survey (RFI Phase 1, Task 2) was conducted at SWMUs 1, 2 and 3 in the fall of 1996 (ICF Kaiser, 1997). No electromagnetic survey was performed at SWMU 4. Both quadrature and in-phase measurements were made on a 10-foot grid spacing over SWMUs 1, 2 and 3(Figures B-1 and B-2 in Appendix B). Interpretation of the terrain conductivity (quadrature phase) map for this SWMU group identified relative high and low conductivity areas within the landfill that are interpreted to represent variations in the type of wastes buried in the landfill.

In general, the highest conductivity measurements were located toward the center of the landfill and represent the bulk of buried material. High conductivity measurements are generally associated with high ionic and/or moisture content. However, metal objects may also produce relatively high conductivity readings. Based on the known disposal of both metal objects and iron oxide wastes, the high conductivity readings are to be expected and were confined to the mounded area where disposal was known to occur. This mounded area is inclusive of SWMUs 2 and 3 and similar conductivity measurements were associated with these areas, indicating that

calculated using the equations in Section 3.2.3 and appropriate exposure parameters for the receptors evaluated.

4.2.3.4 Exposure Risk Assessment Results

Table 4.2-10 provides a summary of the theoretical excess lifetime cancer risks for the construction worker receptor. Non-cancer hazard indices were not calculated as the COI identified is not considered to have non-carcinogenic effects. The total cancer risk for this receptor is 1.9 x 10-6 which is within the acceptable range of 1 x 10-4 to 1 x 10-6 for human health risk established by the USEPA. Given that these risks are acceptable, no refined receptor evaluation was necessary, as discussed in Section 3.2.1.

Risks for the industrial worker were not evaluated as no COIs were identified for the 0-2 feet depth interval.

4.2.4 Discussions with USEPA

Bayer discussed SWMUs 1, 2, 3, and 4 with USEPA during ~~a~~ telephone conferences on May 5, 1999 and September 6, 2000. During the May 5, 1999~~is~~ discussion, it was decided that further evaluation was needed to delineate the areal extent of waste materials in this group of SWMUs, which eventually lead to Phase 3 scope of work.

The September 6, 2000 discussion occurred after the initial submission of the Final RFI report (IT, January 2000). During the discussions, USEPA agreed with the conclusions and recommendations for SWMU Group A as presented in Section 4.2.4: 1) no further action based on the human health exposure risk; 2) construction of an engineered soil cover to reduce infiltration; 3) inclusion in the facility's Institutional Control Plan; and 4) further evaluation as part of the site-wide groundwater CMS based on SSLs.

4.2.5 Conclusions and Recommendations

Based on the exposure risk assessment results, no further action is recommended for SWMU Group A. The analytical results for SWMU Group A indicate concentrations of constituents that exceed USEPA industrial RBCs. However, the concentrations exceeding the industrial RBCs occur at depth where direct soil contact will not occur. Site-specific evaluation indicated that the exposure risks for industrial worker and construction worker scenarios are within the acceptable range identified by USEPA. However, because constituents are present at depth which exceed the USEPA Region III industrial RBCs, Bayer will include the SWMU Group A area in the facility's institutional control plan to ensure worker safety while performing subsurface work. It

should be noted that the boundaries of SWMU Group A have been modified based on the results of the Phase 3 soil borings.

The maximum detected concentrations of two metals, eight SVOCs, and five VOCs exceeded their respective site-specific SSLs, indicating a potential for constituents to leach to groundwater at potentially unacceptable levels. Bayer performs quarterly groundwater monitoring in accordance with a USEPA-approved groundwater monitoring plan. The objective of the groundwater monitoring plan is to ensure that potentially impacted groundwater is captured by on-site recovery wells. The groundwater monitoring has been performed at the facility since 1986 and has consistently shown on-site capture of groundwater by the site's pumping wells.

Although no further action is recommended for SWMU Group A based on the exposure assessment, the potential for constituents to leach to groundwater is a potential concern. ~~Therefore, SWMU Group A will be elevated as a potential source area for constituents identified in groundwater and further action, if necessary, of this SWMU will be evaluated as part of a CMS for groundwater.~~ Therefore, a presumptive remedy of an engineered sol cover, including permeability requirements, is recommended for SWMU Group A to improve surface drainage and reduce the infiltration of precipitation.

SWMU Group B

Table numbering was corrected in text

Table 4.3-1	Sample Depth for SM005-TB14-0001 has been corrected to read 0.00-1.00
Tables 4.3-5 and 4.3-6	Shading has been removed to make more legible
Table 4.3-9	Table (Risk Summary) has been included, excluded during reproduction of report.
Section 4.3.3.4	Reworded section as indicated by USEPA.
Section 4.3.4	Discussions with USEPA have been updated
Figure 4.3-2	Figure Showing Surface Conditions has been added.

integrity of the lagoon is to be maintained. If there were construction activities at SWMU 5 it would most likely occur along the fringe of the berm towards the outside of the lagoon. A small scale construction/excavation project such as the installation of utility lines are more likely and reasonable to occur at this location rather than a large scale construction project. SWMU 6 is the Wastewater Treatment Area. As with SWMU 5, a large scale construction project in this area is not anticipated especially if the integrity of the clarifiers and bioxidation tanks are to be maintained. As a result, the EF value for SWMU B was changed to 30 days per year, which is still conservative since the value assumes exposures to subsurface soils 5 days per week for 6 weeks.

4.3.3.4 Exposure Risk Assessment Results

Table 4.3-9~~10~~ provides a summary of the theoretical excess lifetime cancer risks for the industrial worker and construction worker receptors. Non-cancer hazard indices were not calculated for either receptor because~~since~~ the non-cancer risk for 2,4-TDA is much less and insignificant compared to the cancer risk. Therefore, the non-cancer risk did not need to be calculated. ~~COI identified is not considered to have non-carcinogenic effects.~~ Based on a refined receptor evaluation, the total cancer risk for the industrial worker is 9×10^{-5}, which is within the acceptable range of 1×10^{-4} to 1×10^{-6} for human health risk established by the USEPA.

Table 4.3-9~~10~~ also provides a summary of the theoretical excess lifetime cancer risks for the construction worker receptor. Based on a refined receptor evaluation, the total cancer risk for the construction worker is 9×10^{-5}, which is within the acceptable range of 1×10^{-4} to 1×10^{-6} for human health risk established by the USEPA .

4.3.4 Discussions With USEPA

SWMUs 5 and 6 were discussed with USEPA on April 21, 1999, July 26, 2000, and August 14, 2000. The April 21, 1999 discussion was conducted after submission of the Phase 2 Report (ICF Kaiser, 1998). During the April 21, 1999 discussion, USEPA agreed that samples from borings SM006-TB03 and –TB04 did not make a difference in the statistical outcome of SWMU 6. It was also agreed that additional borings were needed to further delineate the boundaries of SWMU 6. The discussion resulted in SWMU 5 and 6 being combined into SWMU Group B. USEPA concurred with the Phase 2 findings, indicating that further evaluation of these units should be performed as part of the Phase 3 investigation and samples should be collected as indicated in the Phase 2 Report.

The July 26, 2000 and August 14, 2000 discussions were conducted after the initial submission of the Final RFI Report (IT, 2000). During these discussions, IT indicated that the risk assessment was conservative based on the surface conditions in this area. The accessible area of the site is covered with asphalt and gravel. The remainder of the site consists of two impoundments with steep berms. USEPA requested that a surface condition map, Figure 4.3-2, be prepared to aid in the understanding of the site conditions. Based on the surface conditions, USEPA concurred that the exposure scenario used in the risk assessment for the industrial worker was conservative because the direct soil contact pathway was not complete for the accessible portion of the SWMU group.

USEPA also requested further evaluation of detection limits which exceeded the industrial RBCs. The detection limit evaluation is presented in Appendix F. USEPA concurred that elevated detection limits are not an issue based on the rationale presented in Appendix F.

Based on the risk analysis and the discussions, USEPA concurred with the findings and recommendations presented in Section 4.3.5: 1) no further action based on exposure risk; 2) inclusion in the facility's institutional control plan for worker protection during subsurface excavation based on constituents exceeding the industrial RBCs; and 3) further evaluation as part of the sitewide groundwater CMS for constituents exceeding the site-specific SSLs which are also found in groundwater.~~SWMUs 5 and 6 were discussed with USEPA on April 21, 1999. During this discussion, USEPA agreed that placing samples from borings SM006-TB03 and 0TB04 did not make a difference in the statistical outcome of SWMU 6. It was also agreed that additional borings were needed to further delineate the boundaries of SWMU 6. The results of the discussion resulted in SWMU 5 and 6 being combined into SWMU group B. USEPA concurred with the Phase 2 findings, indicating that further evaluation of these units should be performed as part of the Phase 3 investigation and that samples should be collected as indicated in the Phase 2 report..~~

4.3.5 Conclusions and Recommendations

Based on the exposure risk assessment results , no further action is warranted at SWMU Group B. This conclusion is based on the calculated risks for industrial and construction worker scenarios are within the acceptable range defined by USEPA. Additionally, only one constituent (2,4-TDA) exceeded the USEPA Region III industrial RBCs in shallow soil (0-5 ft-bgs). All the samples that exceeded the industrial RBC for 2,4-TDA consisted predominantly of TDI residue,

a visually distinctive material. Because constituents exceed industrial RBCs, Bayer will include SWMU Group B in the facility's institutional control plan for worker safety while performing subsurface work. Comparison to site-specific SSLs indicates a potential for constituents to leach to groundwater at potentially unacceptable concentrations.

One inorganic (nickel) and ten organics (benzene, chlorobenzene, trichloroethene, 1,2-dichlorobenzene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, bis(2-chloroethyl)ether, nitrobenzene, m,p-cresol, and p-chloroaniline) exceeded the site-specific SSLs. Bayer performs quarterly groundwater monitoring in accordance with a USEPA-approved groundwater monitoring plan. The objective of the groundwater monitoring plan is to ensure that potentially impacted groundwater is captured by on-site recovery wells. The groundwater monitoring has been performed at the facility since 1986 and has consistently shown on-site capture of groundwater by the site's pumping wells.

Although no further action is recommended for SWMU Group B based on the exposure assessment, the potential for constituents to leach to groundwater is a potential concern. Therefore, SWMU Group B will be evaluated as a potential source area for constituents identified in groundwater and further action, if necessary, of this SWMU will be evaluated as part of a CMS for groundwater.

TABLE 4.3-1
Soil Analytical Results for
SWMU Group B: SWMUs 5 and 6

SAMPLE ID	SM005-TB12-0608	SM005-TB12-1820	SM005-TB13-0001	SM005-TB13-0305	SM005-TB13-1012	SM005-TB13-1416	SM005-TB14-0001	SM005-TB14-00010	SM005-TB14-0305	SM005-TB14-0811
SAMPLE DEPTH(ft)	6.00-8.00	18.00-20.00	0.00-1.00	3.00-5.00	10.00-12.00	14.00-16.00	0.00-1.00	0.00-1.00	3.00-5.00	8.00-11.00
SAMPLE LOCATION	TB12	TB12	TB13	TB13	TB13	TB13	TB14	TB14	TB14	TB14
SAMPLE DATE	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/10/99	11/10/99	11/10/99	11/10/99
PARAMETER										
Volatiles (µg/kg)										
1,1,1,2-Tetrachloroethane	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
1,1,1-Trichloroethane	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
1,1,2,2-Tetrachloroethane	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
1,1,2-Trichloroethane	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
1,1-Dichloroethane	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
1,1-Dichloroethene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
1,1-Dichloropropene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
1,2,3-Trichlorobenzene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
1,2,3-Trichloropropane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
1,2,4-Trichlorobenzene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
1,2,4-Trimethylbenzene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
1,2-Dibromo-3-chloropropane	<11000	<11000	<110	<110	<1100	<1100	<100	<100	<110	<10000
1,2-Dibromoethane	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
1,2-Dichlorobenzene	160000	52000	47	<24	34000	25000	<23	47	<24	110000
1,2-Dichloroethane	<1200	<1200	<12	<12	<120	<120	<11	<110	<12	<1200
1,2-Dichloropropane	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
1,3,5-Trimethylbenzene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
1,3-Dichlorobenzene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
1,3-Dichloropropane	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
1,4-Dichlorobenzene	6500	<2400	<24	<24	770	930	<23	<23	<24	12000
2,2-Dichloropropane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
2-Butanone	<15000	<14000	<140	<140	<1400	<1400	<140	<140	<140	<14000
2-Chloroethyl Vinyl Ether	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
2-Chlorotoluene	<2500	<2400	<24	<24	24	<230	<23	<23	<24	<2300
2-Hexanone	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
4-Chlorotoluene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
4-Methyl-2-pentanone	<6100	<5900	<59	<60	<590	<590	<57	<57	<60	<5800
Acetone	<38000	<36000	<360	<380	<3700	<3600	<350	<350	<370	<36000
Acrolein	<7400	<7100	<71	<73	<710	<700	<68	<69	<72	<7000
Acrylonitrile	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Allyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5900	<2400	<24	<24	<240	290	<23	<23	<24	<2300
Bromobenzene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Bromochloromethane	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Bromodichloromethane	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
Bromoform	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Bromomethane	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Carbon Disulfide	<1200	<1200	<12	<12	<120	<120	<11	<11	<12	<1200
Carbon Tetrachloride	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Chlorobenzene	330000	230000	29	<12	21000	22000	18	45	<12	92000
Chloroethane	<1100	<1100	<110	<110	<1100	<1100	<100	<100	<110	<10000
Chloroform	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Chloromethane	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
Dibromochloromethane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Dibromomethane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Dichlorodifluoromethane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Ethyl Methacrylate	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Ethylbenzene	<1200	3100	46	<12	<120	<120	<11	<11	<12	<1200
Freon 113	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon 141b	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Isopropylbenzene	<1200	<1200	<12	<12	<120	<120	<11	<11	<12	<1200
Methyl Iodide	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
Methylene Chloride	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300

TABLE 4.3-1
Soil Analytical Results for
SWMU Group B: SWMUs 5 and 6

SAMPLE ID	SM005-TB12-0608	SM005-TB12-1820	SM005-TB13-0001	SM005-TB13-0305	SM005-TB13-1012	SM005-TB13-1416	SM005-TB14-0001	SM005-TB14-00010	SM005-TB14-0305	SM005-TB14-0811
SAMPLE DEPTH(ft)	6.00-8.00	18.00-20.00	0.00-1.00	3.00-5.00	10.00-12.00	14.00-16.00	0.00-1.00	0.00-1.00	3.00-5.00	8.00-11.00
SAMPLE LOCATION	TB12	TB12	TB13	TB13	TB13	TB13	TB14	TB14	TB14	TB14
SAMPLE DATE	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/10/99	11/10/99	11/10/99	11/10/99
PARAMETER										
Naphthalene	<1200	<1200	<12	<12	<120	<120	<11	<11	<12	<1200
Styrene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
Tetrachloroethene	<31000	<29000	<290	<300	<3000	<2900	<280	<29	<300	<29000
Toluene	<2500	6100	110	<24	<2400	<230	<23	<23	<24	<2300
Trichloroethene	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
Trichlorofluoromethane	<6100	<5900	<59	<61	<590	<590	<57	<57	<60	<5800
Vinyl Acetate	<29000	<28000	<280	<290	<2800	<2800	<270	<270	<290	<28000
Vinyl Chloride	<3700	<3500	<35	<36	<3600	<350	<34	<34	<36	<3500
cis-1,2-Dichloroethene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
cis-1,3-Dichloropropene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
m+p-Xylene	<3700	11000	200	<36	<360	<350	<34	<34	<36	<3500
n-Butylbenzene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
n-Propylbenzene	<2500	<2400	<1200	<24	<240	<230	<23	<23	<24	<2300
o-Xylene	<3700	<3500	72	<36	<360	<350	<34	<34	<36	<3500
p-Isopropyltoluene	3100	4900	<24	<24	<240	<230	<23	<23	<24	16000
sec-Butylbenzene	<1200	<1200	<12	<12	<120	<120	<11	<11	<12	<1200
tert-Butylbenzene	<2500	<2400	<24	<24	<240	<230	<23	<23	<24	<2300
trans-1,2-Dichloroethene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
trans-1,3-Dichloropropene	<3700	<3500	<35	<36	<360	<350	<34	<34	<36	<3500
trans-1,4-Dichloro-2-butene	<4900	<4700	<47	<48	<470	<470	<45	<46	<48	<4600
Semivolatiles (µg/kg)										
1,2,3-Trichlorobenzene	<1200	<120	<120	<120	<120	<29000	<110	<110	<120	<1200
1,2,4,5-Tetrachlorobenzene	<1400	<130	<130	<130	<130	<32000	<120	<130	<130	<1300
1,2,4-Trichlorobenzene	<1200	<120	<120	<120	<120	<29000	<110	<110	<120	<1200
1,2-Dichlorobenzene	35000	3900	650	310	82000	1000000	320	1800	3000	72000
1,3-Dichlorobenzene	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
1,4-Dichlorobenzene	1400	130	<110	<110	2100	38000	<100	<100	150	9400
1-Chloronaphthalene	<1100	<110	<110	<110	<110	<26000	<100	<100	<110	<1000
1-Methylnaphthalene	<1200	<120	<120	<120	<1200	<29000	<110	<110	190	<1200
1-Naphthylamine	<9500	<910	<910	<920	<9100	<230000	<87	<880	<920	<8900
2,3,4,6-Tetrachlorophenol	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
2,3-Dichloroaniline	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
2,4,5-Trichlorophenol	<980	<130	<94	<95	<950	<23000	<91	<91	<95	<930
2,4,6-Trichlorophenol	<1200	<130	<120	<120	<1200	<29000	<110	<110	<120	<1200
2,4-Dichlorophenol	<1400	<820	<130	<130	<1300	<32000	<120	<130	<130	<1300
2,4-Dimethylphenol	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
2,4-Dinitrophenol	<8600	<820	<820	<830	<8300	<210000	<790	<800	<830	<8100
2,4-Dinitrotoluene	1900	140	210	<110	<1100	<26000	1800	1200	680	1500
2,4-Toluenediamine	9200UJ	<3600	<3600	<3600	<36000	800000UJ	29000J	<3500	2200UJ	11000UJ
2,6-Dichlorophenol	<1400	<130	<130	<130	<1300	<32000	<120	<1300	<130	<1300
2,6-Dinitrotoluene	<1400	<130	<130	<130	<1300	<32000	440	300	180	<1300
2-Chloronaphthalene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
2-Chlorophenol	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
2-Methylnaphthalene	<1200	<120	<120	<120	<1200	<29000	<110	<110	250	<1200
2-Naphthylamine	<7600	<730	<730	<740	<7300	<180000	<700	<710	<740	<7200
2-Nitroaniline	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
2-Nitrodiphenylamine	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
2-Nitrophenol	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
2-Picoline	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
3,3'-Dichlorobenzidine	<2900	<280	<280	<290	<2800	<70000	<270	<270	<290	<2800
3-Methylcholanthrene	<1400	<130	<130	<130	<1300	<32000	20	<130	<130	<1300
3-Nitroaniline	<740	<71	<71	<72	<710	<18000	<68	<69	<72	<7000
4,4' Methylenedianiline	<16000	<1500	<1500	<1500	<15000	940000	<1400	<1500	23000	29000
4,6-Dinitro-o-cresol	<4200	<400	<400	<410	<4000	<100000	<390	<390	<410	<3900
4-Aminobiphenyl	<6000	<580	<580	<580	<5800	<140000	<560	<60	<580	<5700
4-Aminodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4.3-1
Soil Analytical Results for
SWMU Group B: SWMUs 5 and 6

SAMPLE ID	SM005-TB12-0608	SM005-TB12-1820	SM005-TB13-0001	SM005-TB13-0305	SM005-TB13-1012	SM005-TB13-1416	SM005-TB14-0001	SM005-TB14-00010	SM005-TB14-0305	SM005-TB14-0811
SAMPLE DEPTH(ft)	6.00-8.00	18.00-20.00	0.00-1.00	3.00-5.00	10.00-12.00	14.00-16.00	0.00-1.00	0.00-1.00	3.00-5.00	8.00-11.00
SAMPLE LOCATION	TB12	TB12	TB13	TB13	TB13	TB13	TB14	TB14	TB14	TB14
SAMPLE DATE	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/10/99	11/10/99	11/10/99	11/10/99
PARAMETER										
4-Bromophenyl phenyl ether	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
4-Chloro-m-cresol	<1600	<150	<150	<150	<1500	<38000	<150	50	<150	<1500
4-Chlorophenylphenyl ether	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
4-Nitroaniline	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
4-Nitrophenol	<3800	<360	<360	<370	<3700	<91000	<350	<350	<370	<3600
5-Nitro-o-toluidine	2600	<110	<110	<110	<1100	<26000	<100	<100	250	<1000
7,12-dimethylbenz[a]anthracene	<1700	<160	<160	<170	<1700	<41000	<160	<160	<170	<1600
Acenaphthene	<1400	<130	<130	<130	<1300	<32000	<120	<130	190	<1300
Acenaphthylene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Acetophenone	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Aniline	42000	640	<520	<520	<5200	240000	<500	<500	1300	7500
Anthracene	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Azobenzene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Benzidine	<16000	<1500	<1500	<1500	<15000	<370000	<1400	<1500	<1500	<15000
Benzo(a)anthracene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Benzo(a)pyrene	<1400	<130	<130	<130	<1300	<35000	<120	<130	<130	<1300
Benzo(b)fluoranthene	<1100	<110	<110	<110	<1100	<32000	220	<100	<110	<1000
Benzo(ghi)perylene	<2200	<210	<210	<210	<2100	<53000	<200	<210	<210	<2100
Benzo(k)fluoranthene	<1500	<140	<140	<140	<1400	<35000	510	<140	<140	<1400
Benzoic Acid	<14000	<1300	<1300	<1300	<13000	<320000	<1200	<1300	<1300	<13000
Benzyl Alcohol	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Benzyl butyl phthalate	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
Bis(2-chloroethoxymethane)	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
Bis(2-chloroethyl)ether	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Bis(2-chloroisopropyl)ether	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Bis(2-ethylhexyl) phthalate	<1400	<130	<130	<130	<1300	<32000	160	<130	<130	3200
Bisphenol A	7400	480	1500	200	30000	2300000	12000	6000	7900	21000
Carbazole	<8600	<82	<82	<83	<830	<21000	<79	<80	<83	<810
Chrysene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Cyclohexanone	<6100	<59	<59	<60	<590	<15000	<570	<57	<60	1300
Di-n-butyl phthalate	<1100	150B	290B	220B	<1100	<26000	200B	170B	120B	<1000
Di-n-octyl phthalate	<1500	<140	<140	<140	<1400	<35000	<140	<140	<140	<1400
Dibenzo(a,h)anthracene	<1600	<150	<150	<150	<1500	<38000	<150	<150	<150	<1500
Dibenzofuran	<1100	<110	<110	<110	<1100	<26000	<100	<100	150	<1000
Diethyl Phthalate	2800	<110	<110	<110	1800	41000	<100	120	<110	<1000
Dimethylphthalate	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Ethyl Methane Sulfonate	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
Fluoranthene	<1200	<120	<120	<120	<1200	<29000	<110	<110	140	<1200
Fluorene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Heptachlor	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<93
Hexachlorobenzene	<1700	<160	<160	<170	<1700	<41000	<160	<160	<170	<1600
Hexachlorobutadiene	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Hexachlorocyclopentadiene	<17000	<1600	<1600	<1600	<16000	<4000000	<1500	<1500	<1600	<16000
Hexachloroethane	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Indeno(1,2,3-cd)pyrene	<1700	<160	<160	<170	<1700	<41000	<160	<160	<170	<1600
Isophorone	<1500	<140	<140	<140	<1400	<35000	<140	<140	<140	<1400
Methyl methane sulfonate	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
N-Nitrosodibutylamine	NA	<140	<140	<140	<1400	<35000	<140	<140	<140	<1400
N-Nitrosodimethylamine	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
N-Nitrosodiphenylamine	<3400	<330	<330	<330	<3300	<82000	<320	<320	<330	<3200
N-Nitrosodipropylamine	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
N-Nitrosopiperidine	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
Naphthalene	<1200	<120	<120	<120	<1200	<29000	<110	<110	<120	<1200
Nitrobenzene	6100	540	<11	<110	<1100	<26000	280	210	170	<1000
Pentachlorobenzene	<1400	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300

TABLE 4.3-1
Soil Analytical Results for
SWMU Group B: SWMUs 5 and 6

SAMPLE ID	SM005-TB12-0608	SM005-TB12-1820	SM005-TB13-0001	SM005-TB13-0305	SM005-TB13-1012	SM005-TB13-1416	SM005-TB14-0001	SM005-TB14-00010	SM005-TB14-0305	SM005-TB14-0811
SAMPLE DEPTH(ft)	6.00-8.00	18.00-20.00	0.00-1.00	3.00-5.00	10.00-12.00	14.00-16.00	0.00-1.00	0.00-1.00	3.00-5.00	8.00-11.00
SAMPLE LOCATION	TB12	TB12	TB13	TB13	TB13	TB13	TB14	TB14	TB14	TB14
SAMPLE DATE	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/9/99	11/10/99	11/10/99	11/10/99	11/10/99
PARAMETER										
Pentachlorobenzene (ug/kg)	<860	<82	<82	<83	<830	<21000	<79	<80	<83	<810
Pentachlorophenol	<3100	<290	<290	<300	<3000	<73000	<280	<290	<300	<2900
Phenacetin	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Phenanthrene	<1200	<120	<120	<120	<1200	<29000	<110	<110	240	<1200
Phenol	1600	130	<120	<120	<1200	<29000	120	170	<120	<1200
Pyrene	<1100	<130	<130	<130	<1300	<32000	<120	<130	<130	<1300
Pyridine	<1100	2900	<110	<110	<1100	<26000	<100	<100	<110	<1000
Trimethylphosphate	<1100	<110	<110	<110	<1100	<26000	<100	<100	<110	<1000
Triphenylphosphate	<1600	<150	<150	<150	<1500	<38000	<150	<150	<150	<1500
m,p-Cresol	<2200	<210	<210	<210	<2100	<53000	<200	<210	<210	<2100
m-Nitrotoluene	<1200	<120	<120	<120	<1200	1200000	<110	<110	<120	<1200
m-Toluidine	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
o,p-Toluidine	8000	<82	<82	<83	<830	<21000	83	<80	180	<810
o-Cresol	<980	<94	<94	<95	<950	<23000	<91	<91	<95	<930
o-Nitrotoluene	<1400	<130	<130	<130	<1300	<32000	180	<130	<130	<1300
p-Chloroaniline	74000	190	1400	980	9500	360000	610	2000	1600	25000
p-Dimethylaminoazobenzene	<1600	<150	<150	<150	<1500	<38000	<150	<150	<150	<1500
p-Nitrotoluene	1600	<110	<110	<110	<1100	<26000	120	<100	120	<1000
Metals (µg/kg)										
Antimony	<2.46	<2.35	2.61	3.41	2.54	3.08	<2.27	2.66	2.81	<2.32
Cadmium	1.01	<0.588	0.694	0.727	1.04	1.85	<0.567	<0.571	1.57	0.824
Chromium	11.1	5.79	10.1	7.76	8.67	6.73	4.95	6.80	14.2	6.14
Lead	28.3	13.5	20.2	18.6	19.3	20.4	15.1	14.7	48.7	16.6
Nickel	208	9.25	26.8	17.5	55.7	380	13.8	24.7	41.2	211
Miscellaneous (µg/kg)										
Percent Moisture	18.6%	15.0%	15.0%	16.1%	15.5%	14.7%	11.8%	12.5%	16.1%	13.8%
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BTU from ECD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ignitability (Flash Point) for S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Ash	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH in Water (Solid Sample)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
NA=Not analyzed
B=Blank contamination
J=Estimated concentration
K=Estimated concentration (high)
L=Estimated concentration (low)
R=Rejected Data, Additional Data P
U=Nondetect at reported limit
<=Nondetect at reported limit

Table 4.3-5
Screening of Surface Soils (0-2 feet) to Risk-Based Screening Criteria
SWMU Group B, Bayer New Martinsville

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Range of Detection Limits	Sample of Maximum Detection Limit	Region III Industrial Soil RBC	Maximum Detection or Detection Limit Exceeds RBC
PESTICIDES/HERBICIDES									
Heptachlor	76-44-8	mg/kg	0 - 11	NA		0.09 - 2.6	SM005-TB09-0001	1.3E+00	Max. D.L. >RBC
SEMIVOLATILE ORGANIC COMPOUNDS									
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	0 - 11	NA		0.13 - 2.84	SM005-TB09-0001	6.1E+02	No
1,4-Dichlorobenzene	106-46-7	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	2.4E+02	No
2,4,6-Trichlorophenol	88-06-2	mg/kg	0 - 11	NA		0.11 - 2.36	SM005-TB09-0001	5.2E+02	No
2,4-Toluenediamine	95-80-7	mg/kg	2 - 12	33.3 J - 105 J	SM005-TB02-0001	1.1 - 11.6	SM006-TB04-0001	1.8E+00	Max. Det. & D.L. > RBC
2,4-Dichlorophenol	120-83-2	mg/kg	0 - 11	NA		0.13 - 2.36	SM005-TB09-0001	6.1E+03	No
3,3'-Dichlorobenzidine	91-94-1	mg/kg	0 - 11	NA		0.27 - 14.4	SM005-TB09-0001	1.3E+01	Max. D.L. >RBC
5-Nitro-o-toluidine	99-55-8	mg/kg	1 - 12	3.01 J - 3.01 J	SM005-TB02-0001	0.1 - 2.36	SM005-TB09-0001	1.7E+02	No
Azobenzene	103-33-3	mg/kg	0 - 11	NA		0.13 - 2.84	SM005-TB09-0001	5.2E+01	No
Benzidine	92-87-5	mg/kg	0 - 11	NA		1.4 - 37.8	SM005-TB09-0001	2.5E-02	Max. D.L. >RBC
Benzo(a)anthracene	56-55-3	mg/kg	0 - 11	NA		0.13 - 3.07	SM005-TB09-0001	7.8E+00	No
Benzo(a)pyrene	50-32-8	mg/kg	1 - 11	0.23 - 0.23	SM005-TB07-0001	0.13 - 2.36	SM005-TB09-0001	7.8E-01	Max. D.L. >RBC
Benzo(b)fluoranthene	205-99-2	mg/kg	1 - 11	0.45 - 0.45	SM005-TB07-0001	0.1 - 2.36	SM005-TB09-0001	7.8E+00	No
Benzo(k)fluoranthene	207-08-9	mg/kg	0 - 11	NA		0.14 - 2.36	SM005-TB09-0001	7.8E+01	No
bis(2-Chloroethyl)ether	111-44-4	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	5.2E+00	No
bis(2-Chloroisopropyl)ether	108-60-1	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	8.2E+01	No
bis(2-Ethylhexyl) phthalate	117-81-7	mg/kg	2 - 12	0.49 B - 0.81 J	SM006-TB01-0001	0.13 - 2.84	SM005-TB09-0001	4.1E+02	No
Carbazole	86-74-8	mg/kg	0 - 11	NA		0.08 - 11.8	SM005-TB09-0001	2.9E+02	No
Dibenz(a,h)anthracene	53-70-3	mg/kg	0 - 11	NA		0.15 - 2.36	SM005-TB09-0001	7.8E-01	Max. D.L. >RBC
Hexachlorobenzene	118-74-1	mg/kg	0 - 11	NA		0.16 - 2.36	SM005-TB09-0001	3.6E+00	No
Hexachlorobutadiene	87-68-3	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	7.3E+01	No
Hexachlorocyclopentadiene	77-47-4	mg/kg	0 - 11	NA		0.22 - 2.36	SM005-TB09-0001	1.4E+04	No
Hexachloroethane	67-72-1	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	4.1E+02	No
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0 - 11	NA		0.16 - 2.36	SM005-TB09-0001	7.8E+00	No
m-Toludine	108-44-1	mg/kg	0 - 11	NA		0.09 - 4.73	SM005-TB09-0001	3.0E+01	No
N-Nitrosodibutylamine	924-16-3	mg/kg	0 - 11	NA		0.14 - 2.36	SM005-TB09-0001	1.2E-01	Max. D.L. >RBC
N-Nitrosodimethylamine	62-75-9	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	1.1E-01	Max. D.L. >RBC
n-Nitroso-di-n-propylamine	621-64-7	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	8.2E-01	Max. D.L. >RBC
o,p-Toluidine	106-49-0	mg/kg	0 - 11	NA		0.08 - 12.1	SM005-TB09-0001	3.0E+01	No
Pentachloronitrobenzene	82-68-8	mg/kg	0 - 11	NA		0.08 - 2.36	SM005-TB09-0001	2.2E+01	No
Pentachlorophenol	87-86-5	mg/kg	0 - 11	NA		0.22 - 2.36	SM005-TB09-0001	4.8E+01	No
Trimethylphosphate	512-56-1	mg/kg	0 - 11	NA		0.1 - 2.36	SM005-TB09-0001	1.5E+02	No
VOLATILE ORGANIC COMPOUNDS									
1,2,3-Trichloropropane	96-18-4	mg/kg	0 - 16	NA		0.136 - 0.154	SM005-TB09-0001	8.2E-01	No
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	0 - 16	NA		0.262 - 0.296	SM005-TB09-0001	4.1E+00	No
1,2-Dibromoethane	106-93-4	mg/kg	0 - 16	NA		0.136 - 0.154	SM005-TB09-0001	6.7E-02	Max. D.L. >RBC
Acrylonitrile	107-13-1	mg/kg	0 - 16	NA		1.36 - 1.54	SM005-TB09-0001	1.1E+01	No
Vinyl Chloride	75-01-4	mg/kg	0 - 16	NA		0.262 - 0.296	SM005-TB09-0001	3.0E+00	No

[1] Region III Industrial RBCs for Soil (USEPA, Region III, 1999)
NOTE: Only those constituents whose detected concentration or detection limit exceeded the Industrial Soil RBC in the Total Soils Screening are presented here.

Table 4.3-6
Screening of Shallow Subsurface Soils (0-5 feet) to Risk-Based Screening Criteria
SWMU Group B, Bayer New Martinsville

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Range of Detection Limits	Sample of Maximum Detection Limit	Region III Industrial Soil RBC[1]	Maximum Detection or Detection Limit Exceeds RBC
PESTICIDES/HERBICIDES									
Heptachlor	76-44-8	mg/kg	0 - 23	NA		0.09 - 25.3	SM005-TB02-0305	1.3E+00	Max. D.L. >RBC
SEMIVOLATILE ORGANIC COMPOUNDS									
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	0 - 23	NA		0.13 - 27.6	SM005-TB02-0305	6.1E+02	No
1,4-Dichlorobenzene	106-46-7	mg/kg	0 - 23	NA		0.1 - 95	SM006-TB03-0305	2.4E+02	No
2,4,6-Trichlorophenol	88-06-2	mg/kg	0 - 22	NA		0.11 - 23	SM005-TB02-0305	5.2E+02	No
2,4-Toluenediamine	95-80-7	mg/kg	6 - 25	33.3 J - 9130 J		1.1 - 115	SM005-TB02-0305	1.8E+00	Max. Det. & D.L. > RBC
2,4-Dichlorophenol	120-83-2	mg/kg	0 - 23	NA		0.13 - 23	SM005-TB02-0305	6.1E+03	No
3,3'-Dichlorobenzidine	91-94-1	mg/kg	0 - 23	NA		0.27 - 140	SM005-TB02-0305	1.3E+01	Max. D.L. >RBC
5-Nitro-o-toluidine	99-55-8	mg/kg	3 - 24	0.12 - 6.38	SM005-TB01-0305	0.1 - 23	SM005-TB02-0305	1.7E+02	No
Azobenzene	103-33-3	mg/kg	0 - 23	NA		0.13 - 27.6	SM005-TB02-0305	5.2E+01	No
Benzidine	92-87-5	mg/kg	0 - 23	NA		1.4 - 367	SM005-TB02-0305	2.5E-02	Max. D.L. >RBC
Benzo(a)anthracene	56-55-3	mg/kg	0 - 23	NA		0.13 - 29.9	SM005-TB02-0305	7.8E+00	Max. D.L. >RBC
Benzo(a)pyrene	50-32-8	mg/kg	1 - 23	0.23 - 0.23	SM005-TB07-0001	0.24 - 23	SM005-TB02-0305	7.8E-01	Max. D.L. >RBC
Benzo(b)fluoranthene	205-99-2	mg/kg	1 - 23	0.45 - 0.45	SM005-TB07-0001	0.1 - 23	SM005-TB02-0305	7.8E+00	Max. D.L. >RBC
Benzo(k)fluoranthene	207-08-9	mg/kg	0 - 23	NA		0.14 - 23	SM005-TB02-0305	7.8E+01	No
bis(2-Chloroethyl)ether	111-44-4	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	5.2E+00	Max. D.L. >RBC
bis(2-Chloroisopropyl)ether	108-60-1	mg/kg	1 - 23	71.5 - 71.5	SM006-TB03-0305	0.1 - 23	SM005-TB02-0305	8.2E+01	No
bis(2-Ethylhexyl) phthalate	117-81-7	mg/kg	4 - 24	0.49 B - 0.81 J	SM006-TB01-0001	0.13 - 27.6	SM005-TB02-0305	4.1E+02	No
Carbazole	86-74-8	mg/kg	0 - 23	NA		0.08 - 115	SM005-TB02-0305	2.9E+02	No
Dibenz(a,h)anthracene	53-70-3	mg/kg	0 - 23	NA		0.15 - 23	SM005-TB02-0305	7.8E-01	Max. D.L. >RBC
Hexachlorobenzene	118-74-1	mg/kg	0 - 23	NA		0.16 - 23	SM005-TB02-0305	3.6E+00	Max. D.L. >RBC
Hexachlorobutadiene	87-68-3	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	7.3E+01	No
Hexachlorocyclopentadiene	77-47-4	mg/kg	0 - 23	NA		0.22 - 23	SM005-TB02-0305	1.4E+04	No
Hexachloroethane	67-72-1	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	4.1E+02	No
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0 - 23	NA		0.16 - 23	SM005-TB02-0305	7.8E+00	Max. D.L. >RBC
m-Toluidine	108-44-1	mg/kg	0 - 23	NA		0.09 - 45.9	SM005-TB02-0305	3.0E+01	Max. D.L. >RBC
N-Nitrosodibutylamine	924-16-3	mg/kg	0 - 23	NA		0.14 - 23	SM005-TB02-0305	1.2E-01	Max. D.L. >RBC
N-Nitrosodimethylamine	62-75-9	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	1.1E-01	Max. D.L. >RBC
n-Nitroso-di-n-propylamine	621-64-7	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	8.2E-01	Max. D.L. >RBC
o,p-Toluidine	106-49-0	mg/kg	0 - 22	NA		0.08 - 117	SM005-TB02-0305	3.0E+01	Max. D.L. >RBC
Pentachloronitrobenzene	82-68-8	mg/kg	0 - 23	NA		0.08 - 23	SM005-TB02-0305	2.2E+01	Max. D.L. >RBC
Pentachlorophenol	87-86-5	mg/kg	0 - 22	NA		0.22 - 23	SM005-TB02-0305	4.8E+01	No
Trimethylphosphate	512-56-1	mg/kg	0 - 23	NA		0.1 - 23	SM005-TB02-0305	1.5E+02	No
VOLATILE ORGANIC COMPOUNDS									
1,2,3-Trichloropropane	96-18-4	mg/kg	0 - 32	NA		0.136 - 2.92	SM006-TB03-0305	8.2E-01	Max. D.L. >RBC
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	0 - 32	NA		0.262 - 5.84	SM006-TB03-0305	4.1E+00	Max. D.L. >RBC
1,2-Dibromoethane	106-93-4	mg/kg	0 - 32	NA		0.136 - 2.92	SM006-TB03-0305	6.7E-02	Max. D.L. >RBC
Acrylonitrile	107-13-1	mg/kg	0 - 32	NA		1.36 - 29.2	SM006-TB03-0305	1.1E+01	Max. D.L. >RBC
Vinyl Chloride	75-01-4	mg/kg	0 - 32	NA		0.262 - 5.84	SM006-TB03-0305	3.0E+00	Max. D.L. >RBC

[1] Region III Industrial RBCs for Soil (USEPA, Region III, 1999)
NOTE: Only those constituents whose detected concentration or detection limit exceeded the Industrial Soil RBC in the Total Soils Screening are presented here.

Table 4.3-9
Industrial Construction Worker Scenario
Risk Summary
SWMU Group B

Constituent of Interest	Ingestion	Dermal	Inhalation of Particulates	Inhalation of Volatiles	TOTAL RISK
Summary of Theoretical Excess Lifetime Cancer Risks					
Industrial Workers					
2,4-Toluenediamine	1.88E-05	7.53E-05	1.14E-08	--	9.41E-05
TOTAL	**1.88E-05**	**7.53E-05**	**1.14E-08**	--	**9.41E-05**
Construction Workers					
2,4-Toluenediamine	6.27E-05	2.61E-05	3.96E-09	--	8.88E-05
TOTAL	**6.27E-05**	**2.61E-05**	**3.96E-09**	--	**8.88E-05**

Note: Non-cancer Hazard Indices were not calculated as the COI was not defined as non-carcinogenic.